B.5 DRY WELLS

DESCRIPTION

Commonly known as sumps, french drains, drainfields, and shallow injection wells, dry wells and other such devices simply use gravity to emplace stormwater into the subsurface. A dry well is constructed by digging a hole in the ground and filling it with an open graded aggregate. Stormwater runoff is then diverted to the dry well for infiltration into the ground, allowing it to be stored in the voids. While it may seem harmless and cost-effective at first glance to use these dry wells to infiltrate into the ground, in reality, the impact to groundwater quality from these devices varies and is highly dependent upon many factors.

ADVANTAGES

1. Requires minimal space to install.
2. Low installation costs.
3. Reduces amount of runoff.
4. Provides groundwater recharge.
5. Can serve small impervious areas like rooftops.
6. Helps to disconnect impervious surfaces.

LIMITATIONS

1. Offers little pretreatment which may cause clogging.
2. Dry wells should not be installed where hazardous or toxic materials are used, handled, stored or where a spill of such materials would drain into the dry well.
3. Risk of groundwater contamination in very coarse soils, may require groundwater monitoring.
4. Not suitable on fill sites or steep slopes.
5. Must have a minimum of 3 to 4 feet between the bottom of the dry well and the seasonal high water table.
6. Dry wells service a limited drainage area, typically only rooftop runoff.
7. Dry wells must be located at least 10 feet away, on the down slope side of the structure, from building foundations to prevent seepage.
8. Stormwater runoff carrying bacteria, sediment, fertilizer, pesticides and other chemicals may flow directly into the groundwater.
9. Loss of infiltrative capacity and high maintenance cost in fine soils.
10. Low removal of dissolved pollutants in very coarse soils.
11. Soils must be permeable.
12. Not recommended for use with commercial rooftops unless adequacy of pretreatment is assured.

DESIGN CRITERIA

1. Calculate the volume of stormwater to be mitigated by the dry well using the Los Angeles County Department of Public Works *Method for Calculating Standard Urban Stormwater Mitigation Plan (SUSMP) Flow Rates and Volumes Based on 0.75-inches of Rainfall*.
2. For drainage systems draining paved areas, a minimum of one standard dry well shall be installed for each 6,000 cubic feet of drainage volume, 15,000 cubic feet of drainage volume for landscaped areas.
3. A standard dry well system shall have a minimum effective settling capacity of 1,000 gallons per chamber. (Effective settling capacity equals the distance from the bottom of the settling chamber to the height of the overflow outlet.)
4. Systems are to use a shielding device to enhance separation of petrochemicals from water by gravity differentials. Such devices are to be vented to prevent siphoning or skimming of floating petrochemicals.
5. Systems are to use a hydrophobic petrochemical absorbent with a minimum capacity of at least 128 ounces.
6. A device to screen floating debris such as paper, leaves and other trash must be used to retain such material within the settling chamber.
7. The system must be accessible from the surface for maintenance and inspection. Standard minimum opening is a 24 inch diameter nominal size cast iron grating or manhole cover bolted in at least two locations.
8. A minimum penetration of 10 continuous feet into permeable porous soils is recommended for standard installations. In unstable sandy, gravely soils where "belling out" is a problem, an equivalent of 200 square feet of sidewall area is acceptable (bottom area is not to be included). If such penetration is not achieved or if the required design performance rate is greater than 0.25 cubic feet per second, a constant head percolation test on the completed system will be required to determine performance.
9. Multiple dry wells should be spaced a minimum of 100 feet apart center to center.
10. Inlet connecting pipes to dry well systems should be a maximum of 6 inches in diameter.
11. Dry well surface grates should be raised a minimum of 3 inches above bottom of landscaped retention basins.
12. During construction, dry well inlets (including any remote inlets) should be sealed with two layers of UV protected geotextile fabric to prevent sediments from entering the dry wells until paving and landscaping are complete.

REFERENCES

1. Arizona Department of Environmental Quality, 1995. *Guidance for Design, Installation, Operation, and Maintenance of Dry Wells*, Arizona Department of Environmental Quality, AZ.

2. DEQ Storm Water Management Guidelines, Department of Environmental Quality, State of Oregon. http://waterquality.deq.state.or.us/wq/groundwa/swmgmtguide.htm

3. *Low-Impact Development Design Manual*, November 1997. Department of Environmental Resources, Prince George's County, MD.

4. T. Richman, J. Worth, P. Dawe, J. Aldrich, and B. Ferguson, 1997. *Start at the Source: Residential Site Planning and Design Guidance Manual for Stormwater Quality Protection*, Bay Area Stormwater Management Agencies Association, San Francisco, CA.

The following is a known location where a Drywell was installed. The design of the installed drywell in the location may vary from what is recommended in this SUSMP due to its specific circumstances. Los Angeles County does not endorse nor warranty any design used in the location herein. Each individual case may require that the design be tailored to perform properly.

Installed Location (City/Address)	Brand/Manufacturer	Owner/Client
Calabasas	N/A	City of Calabasas